

I Claim:

1. An apparatus for proportioning a chemical with a solvent, comprising:
a flow measurement apparatus for measuring the flow rate of the solvent;
a control unit for calculating the quantity of chemical to be added to the solvent based at least in part on the flow rate of the solvent; and
a flow control device for metering the quantity of the chemical added to the solvent.
2. The apparatus for proportioning a chemical with a solvent of claim 1, and further including:
a second flow measurement apparatus for measuring the flow of the chemical.
3. The apparatus of claim 1, wherein:
the control unit receives input from the flow measurement apparatus; and
the control unit controls the flow control device.
4. The apparatus for proportioning a chemical with a solvent of claim 1, wherein:
the chemical is a cleaning substance.
5. The apparatus for proportioning a chemical with a solvent of claim 1, wherein:
the chemical is a soap.
6. The apparatus for proportioning a chemical with a solvent of claim 1, wherein:
the solvent is water.
7. The apparatus for proportioning a chemical with a solvent of claim 1, wherein:
the flow of the solvent varies during the operation of the apparatus.

8. The apparatus for proportioning a chemical with a solvent of claim 1, wherein:
the flow rate of the solvent varies according to the quantity of a plurality of spray
wands which are in operation at any given time.

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9. The apparatus for proportioning a chemical with a solvent of claim 1, wherein:
the flow measurement device is a flow sensor.

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10. The apparatus for proportioning a chemical with a solvent of claim 1, wherein:
the control unit is a personal computer.

11. The apparatus for proportioning a chemical with a solvent of claim 1, wherein:
the flow control device is precision pump.

12. The apparatus for proportioning a chemical with a solvent of claim 1, wherein:
the flow control device is a solenoid valve.

13. A method for proportioning a chemical in a vehicle wash system, comprising:
(a) measuring the flow rate of the water;
(b) calculating the flow rate of the chemical necessary to maintain a desired
chemical proportion based at least in part on the flow rate of the water; and
(c) operating a chemical metering apparatus to meter the flow rate of the
chemical into the water.

14. The method of claim 13, and further including:
(d) measuring the flow of the chemical to determine that the correct quantity of the
chemical is being dispensed.

15. The method of claim 13, and further including:
repeating steps a, b and c during the operation of the vehicle wash system.

16. The method of claim 14, and further including:
repeating steps a, b, c and d during the operation of the vehicle wash system.
17. The method of claim 14, and further including:
5 repeating steps c and d until the desired flow rate of the chemical is achieved.
18. The method of claim 13, wherein:
step b is accomplished by a digital control apparatus.
- 10 19. The method of claim 13, wherein:
step b is accomplished by a personal computer.
20. The method of claim 13, wherein:
step b is accomplished using a proportioning algorithm.
21. The method of claim 13, wherein:
step b is accomplished using a PID algorithm.
22. An apparatus for mixing a chemical with water in a vehicle washing device,
comprising:
water flow measurement means for measuring the flow of water;
calculating means for calculating a desired flow rate for the chemical; and
flow rate controlling means for controlling the flow rate for the chemical.
- 25 23. The apparatus of claim 22, and further comprising:
chemical flow measurement means for measuring the flow rate of the chemical.
24. The apparatus of claim 22, wherein:
the water flow measurement means is a flow sensor.

25. The apparatus of claim 22, wherein:
the chemical flow measurement means is a flow sensor.

5 26. The apparatus of claim 22, wherein:
the flow rate controlling means is a solenoid valve.

27. The apparatus of claim 22, wherein:
the flow rate controlling means is a variable rate pump.

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28. The apparatus of claim 27, wherein:
the variable rate pump is an air driven pump.

29. The apparatus of claim 22, and further including:
at least one pump for providing the water under pressure.

30. The apparatus of claim 29, wherein:
the pump is an air driven pump.

NOTICE: This correspondence chart is provided for informational purposes only. It is not a part of the official Patent Application

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CORRESPONDENCE CHART

| | | |
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| | 10 | WASH BAY |
| | 12 | VEHICLE |
| 10 | 14 | GANTRY |
| | 16 | NOZZLES |
| | 18 | SPRAY WAND |
| | 20 | FLEXIBLE TUBE |
| | 100 | CHEMICAL RATIO PROPORTIONING APPARATUS |
| 5 | 102 | MANUAL VALVE |
| | 104 | WAND PUMP |
| | 106 | AIR SUPPLY |
| | 108 | AIR SUPPLY VALVE |
| | 109 | WATER |
| 20 | 110 | WATER SOURCE |
| | 112 | WATER FLOW SENSOR |
| | 114 | CHEMICAL |
| | 114a | SECOND CHEMICAL |
| | 116 | CHEMICAL STORAGE TANK |
| 25 | 116a | SECOND CHEMICAL STORAGE TANK |
| | 118 | CHEMICAL FLOW SENSOR |
| | 120 | CONTROL UNIT |
| | 122 | FIELD COMMUNICATION BUS |
| | 124 | METERING PUMP |
| 30 | 126 | LEVEL SENSOR |
| | 126a | SECOND LEVEL SENSOR |

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| | 128 | MIX MANIFOLD |
| | 200 | ALTERNATE EMBODIMENT |
| | 202 | WATER FLOW PUMP |
| | 204 | WATER FLOW SENSOR |
| 5 | 206 | CHEMICAL FLOW PUMP |
| | 206a | SECOND CHEMICAL FLOW PUMP |
| | 208 | PROPORTIONING SOLENOID VALVE |
| | 208a | SECOND PROPORTIONING SOLENOID VALVE |
| | 210 | CHEMICAL FLOW SENSOR |
| 10 | 210a | SECOND CHEMICAL FLOW SENSOR |
| | 240 | CHEMICAL PIPE |
| | 242 | WATER PIPE |
| | 244 | INJECTOR |
| | 260 | CHECK VALVES |
| 5 | 400 | VEHICLE WASH CHEMICAL PROPORTIONING METHOD |
| | 402 | MEASURE WATER FLOW OPERATION |
| | 404 | CALCULATE CHEMICAL FLOW OPERATION |
| | 406 | ADJUST CHEMICAL FLOW OPERATION |
| | 408 | MEASURE CHEMICAL FLOW OPERATION |
| 20 | | |